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ABSTRACT

This report reviews the 1970-1983 research on the impact of school-based anti-smoking education on smoking related attitudes and behaviors. A summary and introduction to the report are given. Seventy-four research reports are analyzed according to geographic origin, year of publication, and age of the target groups. Anti-smoking education programs within the above typology are further classified by delivery system, objectives, and strategies. Common problems of definition, design, or reporting are identified and elaborated upon. The research findings are discussed in regard to the impact of education and mediating variables on knowledge about smoking, on attitudes toward smoking, and on delivery systems. The success of anti-smoking education programs is examined from the perspective of two objectives: persuading non-smoking children not to smoke; and persuading smokers to smoke less. Conclusions are presented in relation to age, sex, socioeconomic status, and ethnic origin. An analysis of the results from research studies on New Zealand populations is given. The report concludes with several comments on target population groups and programs to effectively address those groups. (BL)

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A Report to:

HERP Research Project
Education Department
Massey University
Palmerston North

REPORT #5

The Effects of Anti-Smoking Education:

A Review of Research 1970-1983

by
Keith Pickens
NZCER

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THE HERP RESEARCH PROJECT

This research project, jointly funded by the Alcoholic Liquor Advisory Council and the National Heart Foundation, is to evaluate the Health Education Resources Project as a means of furthering the development of Health Education, with specific reference to the development, dissemination, use and impact of the Alcohol Education Kit and the Smoking Intervention Kit.

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The Effects of Anti-Smoking Education: A Review of Research 1970-1983.

Keith Pickens[1]

Summary: School-based anti-smoking education can impart information about the origins and consequences of smoking, and it may have an impact on attitudes to smoking. There is also some evidence of a behavioral effect on younger children. Older pupils, those in high risk groups, and those who have already begun to smoke seem, however, to be relatively immune to the effects of anti-smoking education.

Introduction

The damaging effects of cigarette smoking are well known; so too is the difficulty of convincing smokers to give up the habit once it has become firmly established. Most smokers begin to smoke at an early age, and while nicotine dependency probably explains the continuation of the behaviour, other quite different and possibly more amenable factors - such as peer pressure, the imitation of adult behaviour, lack of knowledge about the health consequences, and so on - seem to be associated with its initiation.

[1]New Zealand Council for Educational Research, Wellington, New Zealand.

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For this reason, if no other, anti-smoking education programmes have tended to focus on prevention rather thar cure, typically being timed at or before the onset of smoking behaviour. The objective has been to persuade young people not to start smoking, or, if they have already begun to experiment, to stop before the habit becomes entrenched.

Various strategies have been employed, but nearly all of them are fundamentally educational in as far as the behavioural change or commitment sought is to be voluntary, rational, internalized and permanent. Since most if not all of the target population are of school age, the setting for anti-smoking education has invariably been the classroom.

Some, but by no means all, of the anti-smoking education programmes and packages currently available have had their effectiveness evaluated in some kind of systematic way, and a few have been the subject of on-going study and investigation. This paper is a summary of the findings of these various evaluative exercises and a discussion of some of the implications of these results for policy, programme development, evaluation and research in the field of anti-smoking education for the young.

The Literature

A search of ERIC, *Psychological Abstracts*, *Dissertation Abstracts*, the files of the (U.S.) National Clearinghouse on Smoking and Health, and other sources produced a list of 74 reports (1-74) published 1970-1983, each documenting an anti-smoking education programme and the method by which it was evaluated. This list of studies, while certainly not comprehensive, is probably representative of the approaches to anti-smoking education and its evaluation currently or recently in vogue.

A majority of the studies (Table 1) were of North American origin, with a handful coming from the countries of Western Europe, and a few from the Antipodes. Distribution by year of publication indicates that interest in this particular health problem has increased steadily through the 1970s and early 1980s.

Children and adolescents in the 11 to 14 years age range were the most frequently targeted group followed by teenagers 15 to 16 years of age, then by children 9 to 10. Programmes for children below 9 years of age were rare. A number of programmes were aimed at or, more commonly, included older teenagers, 17 to 18 years of age as well.

Caution

Many of the studies surveyed have defects and deficiencies in their design or in their reporting (Figure 1). In some cases, there are differences on important matters of definition from one study to another. All of these things make the drawing of firm conclusions about the effects of anti-smoking education risky and problematic. It is important to keep this reservation in mind while reading this review.

Note also that in a number of cases, abstracts only of progress reports were available. In other cases, copies of the full report could not be obtained, and abstracts had to suffice. It is possible that access to comprehensive data about the nature, target groups, implementation, evaluation procedures and results of all of the anti-smoking programmes considered below might change either the judgements made in this review or the degree of tentativeness with which they have been made.

Table 1.- Characteristics of Evaluation Reports

A Geographical Origin

Zone	No. of Studies
North America	57
Western Europe	12
Australasia	5

B Year of Publication

Years	No. of Studies
1970-72	5
1973-75	6
1976-78	17
1979-81	23
1982-83	23

C Age of Target Groups

Ages	No. of Studies
7-8	3
9-10	17
11-12	35
13-14	46
15-16	23
17-18	13

Table 2.- Classification of Anti-Smoking Education Programmes

A Delivery Systems/Vehicles		B Objectives		C Strategies	
System/Vehicle	No. of Studies	Objective	No. of Studies	Strategy	No. of Studies
Teachers	40	Knowledge Gain	24	LTHC	17
Peers	17	Attitude Change	28	STHC	7
Students	14	Behavioral Change	63	SOSB	19
Audio-Visual	16	Other	8	Combined	6
Other Adults	3			Unclassified	25

LTHC = Long Term Health Consequences; STHC = Short Term Health Consequences; SOSB = Social Origins of Smoking Behaviour.

Note: Quality of documentation does not allow classification of a number of studies to be more than tentative in nature.

Figure 1.- Anti-Smoking Education Evaluations: Common Problems of Definition, Design or Reporting

1. Imprecise definitions of smoking behaviour. Objectives of intervention not clearly specified.

2. Uncertainty about approach or method being employed. Loose use of educational 'fad' words like decision making, peer influence, and the like. Little information about programme content.

3. Lack of information about sample characteristics and selection. Small sample size.

4. No control group, or controls not randomly assigned, or no information on how controls were selected.

5. Failure to report data on cigarette use in population from which the sample is drawn. No pre-test or other base-line measurements made.

6. No data on reliability and validity of survey instruments given. Insufficient data on statistical analyses employed; inappropriate methods of analysis.

7. Failure to report data concerning 'intensity' of the intervention e.g., number of programme elements, length of programme, training of teachers.

8. Exclusive reliance on self-reported evidence of smoking or non-smoking behaviour. Exclusive reliance on immediate post-intervention evaluation.

9. Failure to measure all possible outcomes e.g., knowledge gains, attitudinal change, behavioural change, other variables. Failure to report extent to which intermediate objectives (e.g. decision making) are achieved.

10. Failure to report impact of different programme elements. Failure to report results, where appropriate, for different components of the sample population.

Based on Goodstadt, M.S. Drug education - a turn on or a turn off? Journal of Drug Education 10: 93, 1980.

Classifications and Categories

Anti-smoking education programmes can be analysed and classified into a number of (overlapping) categories. However, deficiencies in the documentation and differences in terminology from one study to the next means that the allocation of some studies to one or other categories can be a somewhat uncertain and tentative process.

Delivery System/Vehicle

Many programmes are teacher-led. Others use peer group leaders or instructors. Some are self-directed or have substantial elements of student participation. Multi-media or audio-visual approaches are common, and contrast with more traditional text book or lecture (chalk and talk) methods. Role playing, theatrical performances and similar kinds of activities form a distinctive cluster of student participation modalities, as does the use of adults other than teachers: medical people, cancer sufferers, parents and so on. Many programmes use more than one delivery system, which explains why Table 2a totals to more than the number of studies surveyed.

Objectives

All anti-smoking programmes have as their ultimate objective a behavioural change (to stop smoking) or the prevention of a behavioural change (starting smoking). Some specify this as their primary objective; others endeavour to produce negative attitudes to smoking and many programmes aim at increasing pupil knowledge about the health and other implications of smoking behaviour. A number specify personal development or growth in decision making skills or some other social skill as their primary objective.

Table 2b lists the objectives, whether explicit or implicit, of the studies that are the basis of this review.

Strategy

Older programmes tend to concentrate on the longer term health consequences of smoking, are informational in essence, and are inclined to rely on fear or anxiety arousal to produce the desired effects. More recently developed programmes stress the short term health consequences of smoking, or the social origins of smoking behaviour. Some programmes use combinations of these different strategies.

Intensity

The length of the programme, the age level at which it is began, the extent of teacher training provided, the amount of resources devoted to it, and so on, make it possible, at least in theory, to divide programmes into high and low intensity categories. Unhappily, programme reports frequently do not contain enough of the information necessary for a classification of this kind to be made.

Quality of Research

Ideally, only studies that used sophisticated experimental-control group designs, good sampling methods, saliva analysis, long term measurement of impact and which reported data for different high risk target groups should have been considered. Unfortunately, few of the studies available reached this high standard, and one had, therefore, to spread the net fairly widely, excluding in the end only reports based on impressionistic or anecdotal 'evidence' of effectiveness. In a work of this kind, of course, we are concerned not so much with the findings of individual

studies but with groups of studies, and the degree of consistency there is among the results of these studies. To some extent this allows us to overlook weaknesses and deficiencies in particular studies.

The Impact of Education on Knowledge about Smoking

There is no doubt that knowledge about the origins, nature and consequences of smoking behaviour can be imparted or increased by education. Many studies of anti-smoking education attest to this.

It should be noted, however, that in most cases measurement occurred immediately after the completion of the programme, when recall could be expected to be at its highest. Only one study (74) followed up the initial post test with a later test and this, not unexpectedly, found that a fall off in knowledge had occurred. This particular result is very much in line with the findings of studies of knowledge gain and retention in other drug education situations and suggests that what has been found to be the general pattern in drug education (other than smoking) programmes is probably also true of anti-smoking education programmes, namely that there will be little fall off in knowledge during the first 3 months following the programme (76, 82. But cf. 80) that there will probably be some reduction after 6 to 12 months (91-92) and that difficult concepts or ideas will not be retained as well as information of a less complex type (91).

One needs only a nodding acquaintance with the research on learning and forgetting to know that this is the normal and usual pattern with all kinds of factual material, and that it simply calls attention to the well established principle that if long term maintenance of any kind of knowledge, including knowledge about smoking, is required then there must be regular testing, to determine where the losses have occurred, and provision made for relearning as and when this is found to be necessary.

Do some teaching methods or approaches produce a greater initial learning gain than others? Irwin (34) found that students taught by their regular teacher had higher smoking knowledge scores than students taught by a specialist teacher and that students who studied individually had higher scores than students who studied as part of a peer-led group. A study by Sunseri et al. (67) suggests that the involvement of parents in a programme may facilitate smoking knowledge gain. Sine (62) worked with tertiary students and found no difference between knowledge gain when students were given factual information directly and when they acquired it incidentally, in the course of values clarification exercises.

It isn't possible to generalize on the basis of so few studies, and turning to the research on drug education other than smoking isn't particularly helpful either, the handful of studies (77, 86, 89, 90, 95); Benberg, 1973; that raise the question not taking into account factors like the age or ability of the students, the length of the learning period, the kind of information being conveyed, or the skill or attitudes of the teacher. If we ignore this limitation, and simply take the relevant studies one by one, the following possibilities suggest themselves.

1. Planned programmes will be more effective than informal ones (77).
2. Informal approaches will work better with older students (77, 89, 90, 95).
3. Longer programmes will have more impact than shorter ones (79, 96).
4. Multi-media methods will be more effective than traditional methods with below average students (98).
5. Certain characteristics of the group, for example, the number of drug users present, may be more important than the method of delivery (78, 94).

The kind of information conveyed is, of course, an important consideration and in the anti-smoking studies surveyed a large number focussed on the health consequences of smoking behaviour, and something like two-thirds of these particular studies concentrated on the long-term effects rather than the shorter term results. Almost as many of the studies again concerned themselves with the social origins of smoking behaviour and at least one with the addictive nature of the habit. Some programmes, of course, provided two or more distinct types of information. What kind of information is the most effective?

Of the handful of studies that compared information about short term as against long term consequences two (46, 55) endorsed the giving of information about the short term consequences. One (2) found long term consequences information more effective and one (31) found no difference between the effectiveness of either types of information. Perry et al. (55), it should be noted, also provided information about the social origins of smoking behaviour to their subjects.

None of the studies surveyed attempted to compare the effectiveness of health consequences information, whether long or short term, against the effectiveness of information concerning the social origins of smoking behaviour, but the programmes that conveyed information of the former kind (22, 43) reported favourable results as did two programmes (23, 55) that combined information of this kind with information about the short term health consequences of smoking. Denson and Stretch (17) reported that giving information about the addictive nature of tobacco smoking had a favourable effect on smoking onset among their sample of students. Note, however, that this information was combined with information about the long term health consequences of smoking.

There is no clear evidence that giving information about the short-term consequences of smoking is more, or less, effective as a deterrent

than giving information about the social origins of smoking behaviour. There is no evidence that combining the two kinds of information produces a greater effect than either considered separately. But either may be more effective than giving information about the long-term health consequence of of smoking - the research suggesting but not demonstrating in a conclusive way that this is so. The effect of other combinations of information types is even more difficult to assess. None of the studies address this question in any direct way, and all we can say is that the research indicates that different information types are not less effective in combination than separately.

However, the interaction between information type (message) and delivery system (medium), and between these and the characteristics of the target population (pre-smokers or smokers, male or female, etc.) have yet to be investigated in any systematic way (Figure 2), leaving the question of the relative effectiveness of different kinds of information-giving very much an open one.

The fundamental question is, of course, the relationship between information about smoking and smoking behaviour. A number of studies (1, 10, 12, 31, 51, 68) report an increase in smoking knowledge with no corresponding impact on smoking behaviour, indicating very clearly that knowledge about smoking is not a sufficient deterrent in itself. Evans et al., (22) for example, found that nearly all of their sample of 12 year olds believed, that smoking was dangerous to their health. Yet 20 per cent of these youngsters began to smoke nonetheless. Similar findings have been reported by other researchers. Of the studies that do report an increase in knowledge about smoking and a corresponding decrease in smoking behaviour four (7-8, 22, 30) did not employ information-giving as the principle or only educational strategy, making it difficult to decide what the impact of the information-giving component might have been.

Figure 2.- Some Variables Influencing the Impact of Anti-Smoking Messages

1 Source - Characteristics and Credibility

Examples of Sources	*Some Source Characteristics*
Teachers, Peers, Parents, Experts, Ex-Addicts	Status, Personal Attractiveness, Expertness, Age, Ethnicity

2 Message - Characteristics and Tone

Some Message Types

Fear Arousing, One-Sided, Humorous, Emotional, Multi-Faceted, Factual

3 Medium

Some Media Types

Films, Mass Media, Oral Face-to-Face, Tapes, Printed Material, Theatrics

4 Audience

Some Audience Characteristics

Age, Sex, Smoking Experience, Ethnic Identity, Social Class, Educational level

5 Goal

Some Goal Types

To increase knowledge about the short term health consequences of smoking
To increase knowledge about the long term health consequences of smoking
To increase knowledge about the social origins of smoking behaviour
To change attitudes about smoking
To change attitudes about smokers
To discourage experimental smoking
To suppress experimental smoking
To prevent the transition to regular smoking
To encourage regular smokers to stop
To encourage regular smokers to reduce consumption
To enhance decision-making and other relevant skills

Based on Smart, R.G. and Fejer, D. Drug Education : An Information Processing Approach. In: R.G. Smart and D. Fejer (Eds.) Drug Education : Current Issues, Future Directions, Toronto; Addiction Research Foundation, 1974, and Einstein, S. Drug Abuse Prevention : Issues, Problems and Alternatives. In: S. Einstein (Ed.) The Community's Response to Drug Use, New York: Pergamon Press, 1980.

In other cases (11, 17) the subjects were young, and no long term evaluations of programme impact were made. It is important to keep these last two points in mind because it is known that the risk of smoking onset before the early teens is quite low, but that it increases dramatically during the mid-teens. This means that programmes that are timed for the early teens are aimed at a population which is essentially a non-smoking population, certainly one that contains few habituated smokers. Any apparent 'effectiveness' these programmes exhibit may well relate to this fact rather than to the programmes themselves, something which would probably become obvious if the research design incorporated proper controls and long term measurements of impact.

Summary

1 It is quite possible to increase knowledge about smoking in school-age populations.

2 The interactions between message and medium, and between these and the audience are not clearly understood, leaving questions about the effectiveness of different types of information and different types of delivery systems very much open to debate.

3 Information about long term health consequences may be less effective than information about either the short term consequences or the social origins of smoking behaviour.

4 The nature of the relationship between knowledge about smoking and smoking behaviour is far from clear, but it is very evident that knowledge is not a sufficient deterrent in itself.

The Impact of Education on Attitudes to Smoking

A number of studies concerned themselves with attitudes to smoking, reporting changes in a desired direction (1, 7-8, 11-12, 21, 28, 30, 33-34, 48-49, 58-59, 66-68, 70).

In several cases, the attitudinal change was not associated with changes in behaviour (1, 12, 48, 58, 68). In two cases, no attempt was made to measure the impact on behaviour (34, 59).

Needless-to-say, even in those instances where attitude change was associated with behavioural change, it is by no means clear that the former significantly produced or influenced the latter in any way. Of the other relevant studies, several reported failure to influence attitudes in a desired direction (3, 19, 29, 31, 38), and one (69) seems to have change attitudes in an undesired direction and increased smoking behaviour, or at least produced greater honesty in the self-reporting of smoking behaviour.

The first comment to make is that while attitude change or reinforcement may be a reasonable and feasible target for anti-smoking education programmes, it may not be as easy an objective to reach as simple knowledge gain or improvement. There are many reasons for this, but the point at issue, in any case, is not whether attitudes can be changed but the nature of the relationship between attitudes and behaviour. If it is possible to give a student negative attitudes towards smoking and smokers, does this make it more or less likely that he or she will experiment with cigarettes or begin to smoke regularly?

The 'commonsense' answer is that of course anti-smoking attitudes make smoking less likely, and there is some support for this position in research findings (e.g. 83) that suggest a positive relationship between negative attitudes towards a particular drug, and non-use of that drug. Unfortunately, there is also ample evidence that negative attitudes and beliefs can co-exist quite happily with smoking behaviour. This is not a

unique situation, of course, the case of drinking and driving being just one of several instances one can cite where reported attitudes and beliefs conflict with observed behaviour.

The fact of the matter is that the beginning of smoking behaviour, and the transition from experimentation to regular smoking, are very complex psycho-social and physiological events, and many factors influence the timing, progress and outcome of the processes at work. The attitudes of the individual involved is only one of these factors, and it may not be a very important factor. Consequently, anti smoking programmes that have as their *sole* objective anti-smoking attitudinal change are not, as a general rule, likely to have much impact on smoking behaviour. This is true irrespective of whether they reach their objective or not. There is also good evidence (e.g. 80, 97) that attitudes are not fixed or durable structures - over time they fade or give way to other attitudes entirely. The implications for curriculum designers, and for the evaluation of the effects of anti-smoking education, are obvious enough.

Summary

1 It may be possible to give young people anti-smoking attitudes, or modify attitudes favourable to smoking behaviour, at least in the short term.

2 Anti-smoking attitudes may or may not be associated with smoking behaviour, but they do not by themselves prevent smoking behaviour.

Delivery Systems

Peer influence/example and the initiation of smoking behaviour are closely related. Hence the popularity of youth-to-youth anti-smoking programmes, where students are recruited to present anti-smoking education to younger

pupils, or to their peers. However, despite the theoretical soundness of this approach, the effectiveness of using peers as anti-smoking educators has yet to be convincingly demonstrated.

Arkin et al. (2) compared a peer-led program with an adult-led program and found that the adult program produced a greater behavioral change, possibly not a surprising result since the adults involved in the experiment were professional health educators. This study was one of two that made this kind of comparison, the other, (40), endorsing peer leadership. Contradictory findings like this raise questions to do with the selection and training of peer educators, and the kind of programme they offer. Clearly, if youth-to-youth programmes are to work, the first requirement is that the peer leaders must be genuine peer-leaders, that is to say, individuals with high status and credibility in the eyes of the group they are to influence. They must also be given appropriate training and a credible message.

Other peer-leadership anti-smoking programme evaluations used an experimental group-control group design, in effect comparing the peer leadership programme with no programme. Some of these studies reported significant differences between the experimental and control groups (e.g. 32, 43, 70) but even if there are real differences all they may say is that any kind of anti-smoking programme is better than no programme at all. Only one study (25) seems to have considered the impact of involvement in a peer-led programme on the peer leaders themselves, reporting an 'apparent' reduction in smoking behaviour. Williamson and Campbell (74) reported that the knowledge and attitude differences produced by their peer-led anti-smoking programme faded as time passed, and Luepker et al. (40) noted a similar fall off in the impact of their programme with the passage of time.

Other delivery systems that have been used to convey anti-smoking messages include audio-visual packages of various types, the use of adults other than teachers, and dramatics of one kind or another: role playing exercises, skits, and so on.

Arkin et al. (2) found audio-visual aids of no special benefit but did report that the use of highly trained health educators had a measurable impact. In most of the other studies surveyed, no attempt was made to separate out or identify any particular delivery system effects.

Summary

1 Youth-to-youth programmes are relatively common and on the surface at least soundly based. Nonetheless, the results to date are not particularly persuasive. However, this may be because of the way in which the principle has been implemented rather than because of any intrinsic defect in the theory itself.

2 There is no clear evidence that any of the non-traditional delivery systems are more, or less, effective than the traditional methods of classroom instruction. The key factor is probably the priority given to teacher training and development in both traditional and non-traditional instructional techniques.

Objectives

Anti-smoking programmes which attempt to improve knowledge about smoking, either its origins or consequences or both, but which do not then attempt to measure the impact of improved knowledge on behaviour, are of little more than academic interest - irrespective of whether they achieve their objective or not. The same is true of programmes that aim to induce anti-smoking attitudes or modify pro-smoking attitudes, or which have as

their objective the enhancement of decision-making skills or some other kind of indirectly related variable.

This is not to imply, of course, that programmes of these various types have no value. But it is to say that until a clear relationship can be demonstrated between these particular outcomes and non-smoking behaviour their usefulness must be regarded as uncertain if not questionable. It is also to say that in anti-smoking education, as in all areas of drug education, the primary and fundamental objective is to influence behaviour.

If children do not smoke the objective is to reinforce this non-smoking behaviour, that is to say, to persuade them not to start. If they are already beginning to smoke, the objective must be to persuade them to stop before they become habituated. If they are already confirmed smokers, the aim must be to persuade them to at least reduce consumption - fewer cigarettes smoked, low-tar brands chosen, and so on.

To what extent do anti-smoking education programmes achieve these objectives and, perhaps the more important question, how is the degree of success measured?

Objective 1 Persuading Non-Smoking Children Not to Start Smoking

Arkin et al. (2) targeted non-smoking young adolescents in their study, and reported significant success in either persuading their subjects to remain non-smokers or in delaying the uptake of tobacco. Thiocyanate analysis was used to validate the accuracy of these outcomes.

However, the post test seems to have been carried out a month after the completion of the programmes, and no later or subsequent measurements seem to have been made. Did the programmes have a permanent or long term effect? That is anybody's guess at this stage. What kinds of students moved out of the non-smoking category during the course of the intervention? No data is reported on this important question. What was happening among

12 year olds not exposed to the programmes? There was no control group, comparisons being made among a number of treatments. This means that one cannot be absolutely sure that the results obtained were programme effects - maybe something else was going on, influencing all 12 year olds in the community in an anti-smoking direction We cannot even be sure that the results obtained were positive - maybe more untreated 12 year olds remain non-smokers than did 12 year olds exposed to the programmes.

It is by no means unknown for drug education programmes aimed at essentially pre-user age groups to in fact increase the incidence of experimentation and drug uptake among the target groups.

It is also important to note that 12 year olds are largely a non-smoking population, in the sense that one does not expect to find many regular smokers among them. However, despite the fact that a sizeable minority of the treatment groups had, at baseline, some smoking experience no data on the programme effects on experimental smokers seems to have been obtained. For these reasons, it could be argued that all Arkin et al. did was to 'persuade' non-smokers not to smoke.

Evans et al. (23) reported results similar to those of Arkin et al., but the same objections apply. For instance, post testing occurred at 1, 5 and 10 weeks, and there is no data that the restraining effects noted were long term or permanent in nature. Evans et al. did employ a treatment group-control group research design, and the measurement procedures were more sophisticated than mere self-reportage. One can feel confident therefore that the intervention did have some impact, a feeling reinforced by the findings of Botvin et al. (8), Hurd et al. (32), McAlister et al. (43), Telch et al. (70), Denson and Stretch (17), Tell (71), Coe et al. (13), Luepker et al. (40), McAlister et al. (42) and, of course, by Arkin et al. (2) as well.

The issue thus becomes not if there is an impact but how durable it is and, secondly, on which kind of students does education of the kinds described most impact? Telch et al. (70) reported strong effects after an interval of 21 months, (self report), Coe et al. (13) after 12 months, (self report). Luepker et al. (40) after 3 years (saliva analysis) and McAlister et al. (42) after 2 years (enhanced self report).

The second issue, the kinds of students most affected, is probably the more important of the questions to be asked since it is clear from all of the studies that a sizeable minority of the treatment groups made the transition from non-smoking to smoking status during the course of the interventions. Unfortunately, data on the characteristics of these students, compared to their more smoking-resistant peers, were not collected.

There are, however, some indications in the literature that sex influences receptiveness i.e. girls are usually least affected (14, 50, 69, 70. But cf. 39) and that children already smoking regularly are more resistant (35). Social economic status and ethnic identification are also fairly predictable sources of differential programme impact as well.

Objective 2 Persuading Smokers to Smoke Less Frequently or Persuading Experimental Smokers not to Begin Regular Smoking

Evans et al. (22) reported that their sample of 12 year olds smoked less frequently than the control group, measurement being taken at age 13 and again at age 14. Measurement procedures involved saliva analysis, and can therefore be regarded as objective. However, frequency of smoking is not defined, making it difficult to assess the nature of the behavioural change, and making comparison with other studies problematic. The other main difficulty with this study relates to the fact that regular smoking develops over time, in a series of steps or phases, and is best thought of as a process rather than a single event. This process is not commonly

completed before the early teens - nor is it commonly initiated after the late teens. Hence intervention aimed at preventing the onset of regular smoking or at persuading regular teenage smokers to reduce consumption if not stop altogether, needs to be targeted at the mid-teens (14 - 16 years), and measurement continued until the late teens, if accurate assessments of program impact are to be obtained.

By this standard, Evans et al. (22) produced promising but not conclusive evidence of success. Other programmes aimed at the mid or late teens, i.e. at a population containing a significant number of regular smokers, cannot even have this modest claim made for them. Beaglehole et al. (3) measured the impact of their intervention after 6 months, and reported failure to influence either kind of smokers. Biener (4) reported different degrees of success with different age groups, and least success with the older teenagers, concluding that early education was the best remedy. Davidson and Fletcher (11) failed to change smoking behaviour in their sample of late teenagers and young adults and Mills et al. (45) reported that their program had little effect on the majority of the high school students studied. Similar results were reported by Monk et al. (48), and by Sine (62).

Singer (63) reported success in reducing consumption among mid to late teenagers, but he worked with youngsters who wished to stop smoking and he also appears to have employed a counselling model. Wexler (73) worked with a population aged between 12 and 17 years of age, and produced evidence of positive impact. However, no data on the age groups most affected is provided.

Conclusions

The findings of research into the behavioural effects of anti-smoking education supports two principal conclusions, one more strongly than the other.

The first is that there is a fair probability that anti-smoking education directed at the pre-teen and early-teen age groups has a beneficial if maybe only temporary impact on the experimental smoking behaviour of these age groups. However, this observation needs to be heavily qualified in as far as it seems that some children will begin to experiment, or continue to experiment with tobacco, and will eventually make the transition to regular smoking irrespective of what is provided in the way of anti-smoking education. This is because the social and other pressures on these children pre-disposing them to become smokers far outweigh the influence that the school is able to bring to bear.

Female sex, low SES and membership of minority ethnic groups are some of the characteristics that these high-risk children seem to possess, and the presence, or absence, of pupils of these seemingly more smoking-prone types in a classroom may explain a large part of either the apparent success or failure of the anti-smoking education being used. If this is indeed the case, then the real value of an anti-smoking programme may be that it reinforces non-smoking dispositions, in effect, encouraging children who are already smoking-resistant to stay non-smokers. And if this is true, it raises questions to do with the cost-effectiveness of school-based anti-smoking education, and the best use of anti-smoking dollars.

The second conclusion is that anti-smoking education programmes directed at the late teenage population seem to have little impact, almost certainly because of the onset of regular smoking and the habituation that has occurred. If preaching to the already-converted is a waste of time, so is preaching to the deaf.

The New Zealand Context

New Zealand children know that smoking is harmful to their health (e.g. 75, 88). Despite this knowledge, large numbers of them continue to experiment with smoking and eventually begin to smoke regularly. The onset rate is higher for Maori and part-Maori pupils that it is for Pakeha pupils. Among Pakeha boys, smoking rates may be stable or even declining, but they are on the increase among Pakeha girls. Maori or part-Maori girls have the fastest rates of increase of any sex/ethnic group.

At the 1976 (85) census it was found that of the population aged 15 and over 38 per cent of the Pakeha men and 30 per cent of the Pakeha women were smokers, compared to 56 per cent of Maori men and 59 per cent of the Maori women. Of Maori women aged 20-24, no less than 68.5 per cent were regular smokers. It is against these various figures - both for children and adults - that the significance of the findings of overseas studies of anti-smoking education have to be considered.

Of the handful of studies that controlled for sex most indicate that girls are likely to be more resistant to anti-smoking education than boys. This ties in with survey data, from a number of New Zealand and overseas sources, that reports increasing rates of smoking among girls compared to boys. The implication, for teachers and curriculum developers, is that the anti-smoking programmes currently available do not address the special motivations of girls. For researchers, the task is to discover why it is that the onset rate among girls is increasing, and to develop and trial effective counter measures.

None of the overseas studies controlled for ethnic origin, but many surveys of smoking behaviour (e.g. 85) are available, and these show a high correlation between low SES, low educational attainment, and smoking behaviour. Given the strong association between the first of these two

variables, and membership of minority ethnic groups, and taking into account the census data on smoking among the Maori population, the first implication for New Zealand is that anti-smoking education is likely to have less impact on Maori than Pakeha pupils.

It is also likely to be less effective with low SES pupils, whether Maori or Pakeha, and with lower stream pupils, whether Maori or Pakeha.

Smoking rates among non-Maori boys may be stable or even decreasing, in line with the trends for non-Maori adult males. This data, however, almost certainly refers to boys (and adults) of middle or upper SES, rather than to non-Maori boys (or adults) in general.

In the absence of any energetic school-based anti-smoking education programmes over the last decade, this non-smoking trend among boys must be related in some way to the effects of anti-smoking messages directed at the adult population over the same period of time. The introduction of school-based anti-smoking education from this point on may reinforce and accelerate the trend towards non-smoking among non-Maori boys. Alternatively, it may have no positive impact at all. In any case, one would expect to find that the anti-smoking trend now evident will eventually 'bottom out', leaving a core of youngsters resistant to the effects of anti-smoking education, whether school-based or not.

Summary

1 Maori pupils, girls and above all Maori girls, lower stream and low SES pupils are high risk target groups. The anti-smoking education programmes currently available are likely to have only minimal effect on pupils of these various types.

2 In the absence of systematic and long-term school-based anti-smoking education smoking rates among non-Maori boys have begun to decrease or at least stabilize. The implications and significance of this development need to be carefully assessed.

Concluding Comments

Children begin to smoke, by and large, because their parents, brothers and sisters, and friends do so. They live in a social milieu which accepts smoking as normal and natural behaviour and encourages it, and they respond accordingly.

The first step towards a non-smoking generation is therefore to establish a non-smoking environment and climate, i.e. non-smoking parents, non-smoking adult models, including teachers, non-smoking siblings and non-smoking peers.

As far as the adult population is concerned, there needs to be continuous persuasion and pressure to reduce smoking, not merely via adult education activities of different kinds, and the provision of smoking cessation programmes, but by legislation restricting smoking in public places, outlawing advertising and promotional activity, controlling the availability of cigarettes, taxing consumption, and so on.

Special attention needs to be paid to high risk adult populations which seem to be resistant to all forms of education and persuasion.

The example of parents and other adults is an important factor but peer pressure is probably the most powerful of the factors that explain the initiation of smoking in young people. Producing an anti-smoking social climate at the peer group level is not going to be an easy task, but one component of the smoking climate that currently exists is the perception of young people that smoking is adult behaviour, the norm among adults, and a characteristically adult way of coping with stress. For this reason,

anything that reduces smoking behaviour among adults will eventually reduce the onset rate among children as well. However, it is important not to overlook the potential value of legislative action limiting children's access to cigarettes, setting age or other kinds of restrictions on smoking behaviour and so on.

School-based anti-smoking education can only be a very small part of the answer to the problem of smoking in our society. By itself, it can have only the most minimal impact. In association with legislative and financial measures, and programmes for adults in general and special high risk groups like parents, women and Maoris in particular, it is likely to be more effective.

There is a need for a co-ordinated policy on smoking, with a clearly stated objective, linking together social, economic, political and educational components, not forgetting the need for on-going research into the origins of smoking behaviour in our young people and into the effectiveness of anti-smoking programmes and activities of all types. In the absence of such a policy, school-based anti-smoking education will remain a mainly ineffectual activity focussed on symptoms rather than causes.

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